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137. Proposed by G. B. M. ZERE, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

At the corners of a triangle sides  $a, b, c$  feet are towers  $d, e, f$  feet high. At what point must a ladder be placed so that it will just reach to the top of each tower without moving? How long is the ladder? Substitute  $a=200, b=180, c=150, d=60, e=50, f=30; d, e, f$  at  $A, B, C$ , respectively.

\*\*\* Solutions of these problems should be sent to B. F. Finkel not later than Jan. 10.

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### ALGEBRA.

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125. Proposed by LESLIE L. LOCKE, Instructor in Mathematics, Michigan Agricultural College, Ingram County, Mich.

What special expedient will solve the system

$$\left. \begin{array}{l} x^4 - y^4 = 369 \\ x - y = 1 \end{array} \right\} ?$$

126. Proposed by CHARLES C. CROSS, Meredithville, Va.

A and B run a race; B, who runs slower than A by  $a$  miles in  $b$  hours, starts first by  $c$  minutes, and they get to the  $n$ -mile stone together; required their rates of running. If  $a=1, b=2, c=2$ , and  $n=4$ , what is the result?

\*\*\* Solutions of these problems should be sent to J. M. Colaw not later than Jan. 10.

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### GEOMETRY.

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154. Proposed by ALFRED HUME, C. E., D. Sc., Professor of Mathematics, University of Mississippi, P. O., University, Miss.

The angle between the edge of a trihedral angle and the bisector of the opposite face angle is less than, equal to, or greater than, half the sum of the other two face angles, according as it is itself acute, right, or obtuse.

155. Proposed by J. C. NAGLE, M. A., M. C. E., Professor of Civil Engineering, State Agricultural and Mechanical College, College Station, Tex.

A special case of the following problem was sent me some time ago by an ex-member of one of my engineering classes, as occurring on the Southern Pacific Ry. near Devil's River:

Two straight tracks,  $p$  feet between centers, are to be united by a cross-over composed of two curves of radius  $R$ , and a length  $L$  of intervening tangent. Required the central angles and the distance between tangent points, measured along main track. In the special case referred to  $p$  was 62 feet,  $L$  100 feet with  $9^\circ 30'$  curves.

156. Proposed by F. M. McGAW, A. M., Professor of Mathematics, Bordentown Military Institute, Bordentown, N. J.

To construct an equilateral triangle such that its vertices shall be in each of two parallel lines and a point fixed between these lines.

\*\*\* Solutions of these problems should be sent to B. F. Finkel not later than Jan. 10.

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### CALCULUS.

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116. Proposed by JOHN M. COLAW, A. M., Monterey, Va.

"Prove that the length of the *greatest* beam of square section that can be cut from a log  $l$  feet long and in the shape of a conic frustum, diameters  $D$  and  $d$ , is  $\frac{1}{3}lD \div (D-d)$  feet."